

## CLAIMS

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A concrete module for assembling floating structures comprising:
  - a module having a buoyant core surrounded by a concrete shell, said module having a top, at least three sides and a bottom with a plurality of said modules adapted to be interconnected to present a floating structure;
  - one or more sides of said module having a curved surface such that vertical edges of said side of said module can butt against vertical edges of a side of an adjoining module without a center area on abutting modules contacting each other;
  - a first pair of passages for receiving a first pair of interconnecting members through said module in a first plane, said first plane below and generally parallel to an upper surface of said top of said module; and
  - a second pair of passages for receiving a second pair of interconnecting members through said module in a second plane, wherein said second pair of passages are generally transverse to said first pair of passages, and said second plane is below and generally parallel to said first plane.
2. The concrete module as set forth in claim 1 further comprising one or more locking keys extending from one or more of said sides of said module along a vertical edge of said sides and one or more locking keyholes in one or more of said sides of an adjoining module generally aligned with said locking keys.

3. The concrete module as set forth in claim 1 further comprising one or more locking keys extending from one or more of said sides of said module along a vertical edge of said sides, and one or more locking keyholes in one or more sides of said module along said vertical edge of said sides.

4. The concrete module as set forth in claim 3 wherein said locking keys and locking keyholes along a vertical edge of said side are generally vertically aligned.

5. The concrete module as claimed in claim 4 wherein said one or more locking keys of a module are generally vertically and horizontally aligned with one or more locking keyholes of an adjoining module.

6. The concrete module as set forth in claim 1 wherein said buoyant core is made of a block of expanded polystyrene.

7. The concrete module as set forth in claim 1 wherein said buoyant core includes at least two notches in a top surface of said buoyant core, said notches for receiving reinforcing rods and concrete to form reinforcing ribs.

8. The concrete module as set forth in claim 1 wherein said buoyant core has beveled or rounded corners and a tapered upper portion along sides of said buoyant core, said beveled or rounded corners and tapered side portion providing extra strength for said concrete shell.

9. The concrete module as set forth in claim 1 wherein said buoyant core has grooves along said sides, said grooves presenting a path for forming said first and second passages.

10. The concrete module as set forth in claim 1 further comprising a plurality of brackets, said brackets used to attach items and other structures to a floating structure made with said concrete modules, and to provide protection of said concrete shell and add strength to said floating structure.

11. The concrete module as set forth in claim 1 wherein said buoyant core includes a first plurality of pairs of horizontally aligned grooves along a first pair of opposite sides of said buoyant core, and a second plurality of pairs of horizontally aligned grooves along a second pair of opposite sides, wherein each of said pairs of horizontally aligned grooves lie in separate and generally parallel horizontal planes.

12. The concrete module as set forth in claim 11 wherein one or more of said grooves includes a passage for receiving an interconnecting member through said module.

13. A concrete module for assembling floating structures comprising:  
a buoyant core having a top, three or more sides, a bottom and one or more chamfered or rounded corners, said sides having a tapered upper portion and one or more grooves generally parallel with said top, said top having one or more notches,  
a concrete shell surrounding said buoyant core,  
two or more passages through said module with said passages corresponding to said grooves in said buoyant core with at least one of said passages in each of two non-common planes, said planes being generally parallel with a top surface of said concrete shell;  
one or more locking keys extending from one or more sides of said module;  
one or more locking keyholes in one or more sides of said modules; and  
an interconnecting means extending through said passages to join a plurality of said modules together to form a floating structure;  
whereby said locking keys of one of said plurality of said modules are aligned with said locking keyholes of another module abutting along a side of said one of said plurality of modules.

14. The concrete module as set forth in claim 13 in which said buoyant core is formed from expanded polystyrene.

15. The concrete module as set forth in claim 13 in which said concrete shell is made with a reinforced concrete.

16. The concrete module as set forth in claim 13 in which said concrete shell is made with a lightweight reinforced concrete.

17. The concrete module as set forth in claim 13 in which said concrete shell is made using concrete with an expanded shale aggregate.

18. The concrete module as set forth in claim 13 in which said concrete shell is made with concrete reinforced with a fibrillated fiber.

19. The concrete module as set forth in claim 13 further comprising one or more curved surfaces on one or more sides of said module, said curved sides presenting a means for said modules to abut one another along vertical edges of said sides of said module.

20. The concrete module as set forth in claim 13 further comprising one or more reinforcing ribs, said reinforcing rib being made with a reinforcing rod and concrete within said notches in said top surface of said buoyant core, said reinforcing rib being continuous and integrated with said concrete shell to provide extra strength to said top surface of said module.

21. The concrete module as set forth in claim 13 wherein said interconnecting means comprises a rod with threaded ends, said rod extending through said passages to interconnect and join a plurality of modules together to form a floating structure, and nuts on said threaded ends to secure said modules to said interconnecting means.

22. The concrete module as set forth in claim 13 wherein said interconnecting means comprises a cable with threaded ends, said cable extending through said passages to interconnect and join a plurality of modules together to form a floating structure, and nuts on said threaded ends to secure said modules to said interconnecting means.

23. The concrete module as set forth in claim 13 further claiming a plurality of different shaped brackets, said brackets provided for attaching other structures and items to said floating structure made with said module, for providing protection to said modules at said passages and to add strength to said floating structure at an intersection between two of said modules.

24. The concrete module as set forth in claim 13 wherein said buoyant core includes a first plurality of pairs of horizontally aligned grooves along a first pair of opposite sides of said buoyant core, and a second plurality of pairs of horizontally aligned grooves along a second pair of opposite sides, wherein each of said pairs of horizontally aligned grooves lie in separate and generally parallel horizontal planes.

25. The concrete module as set forth in claim 23 wherein one or more of said grooves includes a passage for receiving an interconnecting member through said module.

26. A mold for forming a concrete module for a floating structure comprising:

a bottom plate;

at least three side plates each secured along a lower edge to said bottom plate;

said lower edge of said side plates each having a bevel extending inwardly toward a center portion of said bottom plate;

said side plates each having two vertical edges and a vertical surface curved inwardly toward a center area of said mold;

said vertical edges of a side plate abutting adjacent vertical edges of an adjacent side plate to form an enclosure.

27. The mold as set forth in claim 26 further comprising an at least one key form extending outwardly from each of said side plates proximal a vertical edge and an at least one keyhole form extending inwardly from each of said side plates proximal a vertical edge of said side plate.

28. The mold as set forth in claim 27 wherein said at least one lock key form and said at least one lock keyhole form proximal a vertical edge are generally vertically aligned.

29. The mold as set forth in claim 26 wherein said side walls include one or more vertically spaced apart apertures proximal said vertical edges and in axial alignment with an aperture in an opposing side wall.

30. A method of forming a concrete module for assembling floating structures comprising the steps of:

cleaning the interior surfaces of a mold having a bottom and at least three sides,  
oiling the interior surfaces with a concrete release coating,  
placing a pre-trimmed foam core upside down in said mold,  
inserting core rods through apertures in said sides which are axially aligned with  
apertures in opposite sides of said mold and grooves in said foam core,  
adding concrete to said mold over and around said foam core,  
vibrating the sides of said mold,  
scraping the concrete flush with the top edges of the sides of the mold to finish the  
bottom surface of the concrete module,  
removing the core rods after the concrete has reached a semi-plastic condition,  
removing the concrete module from the mold and placing the concrete module right  
side up for use or storage after the concrete cures.